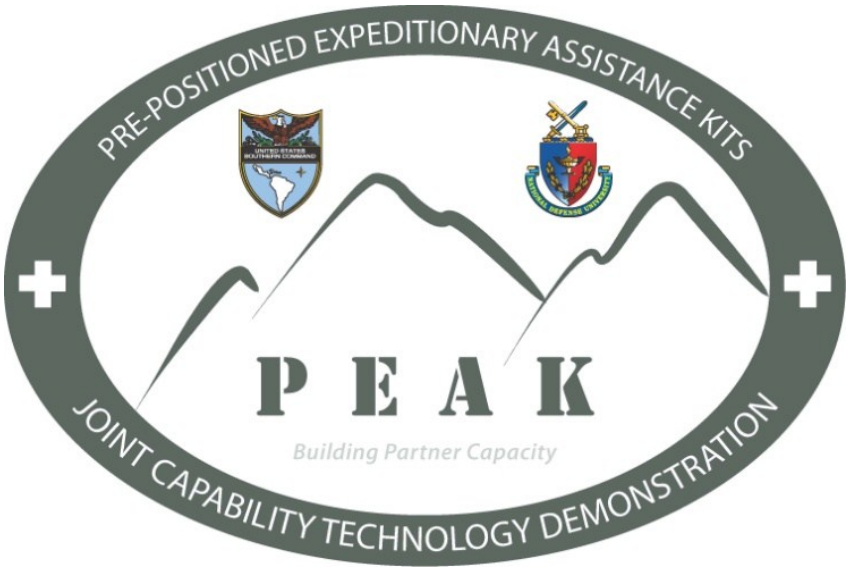


PRE-POSITIONED EXPEDITIONARY ASSISTANCE KIT (PEAK)

USER MANUAL—POWER

MAIN AND REMOTE SITE

MARCH 2012

TABLE OF CONTENTS

PURPOSE OF THIS MANUAL

The purpose of this manual is to provide the user with an abridged version of the complete versions of the PEAK component user manuals in order to facilitate rapid employment of the PEAK capabilities. It is not intended to replace the manuals provided by the vendors of the PEAK components. Should the user have questions or concerns while operating the components, the user should consult the full version of the respective component manual. If the manual does not provide adequate information, the user should consult technical support of the vendors listed in this manual.

WARNINGS AND CAUTIONS

Users should become familiar with all components of the PEAK prior to operation, and they should heed all warnings and cautions. Failure to act appropriately may result in death, serious injury, and/or damage to the PEAK equipment.

OVERVIEW OF PEAK

The Pre-positioned Expeditionary Assistance Kit (PEAK) Joint Capability Technology Demonstration (JCTD) is a joint, interagency and partner nation project over Fiscal Years (FY) 2010-2011. The objective of the PEAK JCTD is to demonstrate and transition an array of capabilities for field distributed essential services including potable water, power, communications and situational awareness. The PEAK kits will provide effective, low-cost and sustainable crisis services that support and build a key capacity in partner nations to promote security and stability in the theater. PEAK will enhance partner nation capabilities to carry out key missions through proactive US military to foreign military engagement and through US civilian organization to foreign government engagement, will improve the partner nations' ability to provide critical services for targeted purposes during the first days of a natural or man-made crisis through a structured planning process involving public, private, whole of government, and trans-national participants, and will collaboratively enhance regional stability.

PEAK OPERATIONAL IMPACT:

PEAK will deliver an array of capabilities that can be pre-positioned to help provide sustainable, essential services in the first 72 hours after a disaster event (See PEAK Solution and PEAK OV-1):

- Potable **water** from local sources
- Reliable **power** from primarily renewable sources
- Reliable **power** from primarily renewable sources
- Local **situational awareness** & information sharing

PEAK Operational View (OV-1)

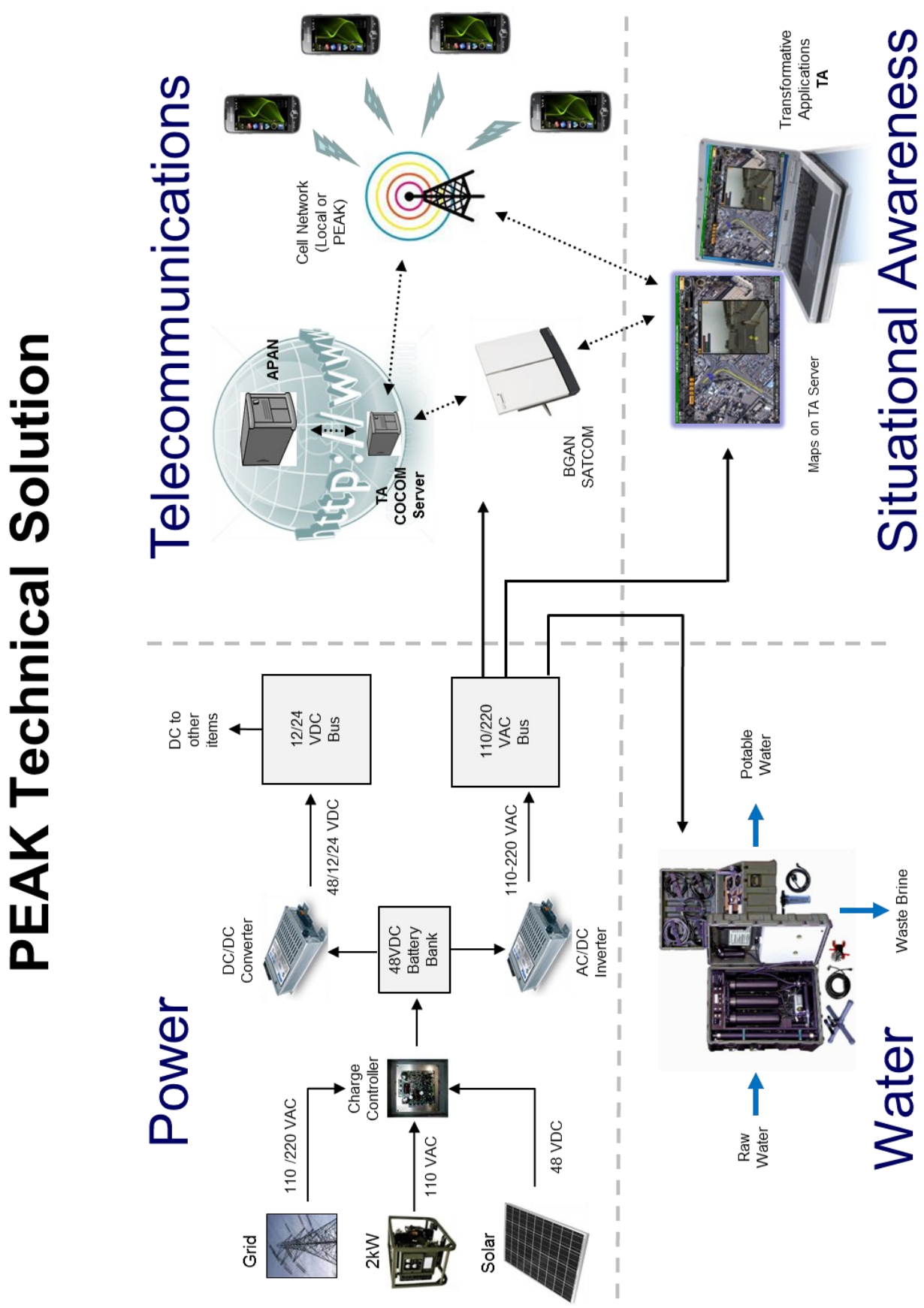
- Equipment cost: ~$500K/kit
- Refurbishment cost post deployment: $2K/kit
- Semi-annual maintenance cost: $2K/kit
- Personnel Required: 6 persons (full kit deployment)
- Time to deploy: 12 hours max
- Anticipated duration of deployment: 72 hours min or until no longer required
- Minimum training requirement: 2 days
- Deployable by Air (Fixed Wing and Rotary), Land and Sea
- Configurable as components, on one (1) 463L Pallet, or one (1) HMMWV Trailer (provided)

HQ receiving PEAK data for decision making and response coordination

Scenario: La Cieba, Honduras
- Hurricane landfall within 24 hours
- Expected loss of power, water, comms
- Honduras deploys PEAK into area to provide situational awareness and comms after hurricane passage to help shape robust follow-on assistance

JTF-Bravo: Two (2) pre-positioned PEAK at Soto Cano Air Base, Honduras

Image of Honduras provided by www.phonebookoftheworld.com


PEAK Technical Solution
Telecommunications
Situational Awareness
Power
Water
Cell Network (Local or PEAK)
APAN
TA COCOM Server
BGAN SATCOM
Transformative Applications TA
Maps on TA Server
DC to other items
12/24 VDC Bus
110/220 VAC Bus
48/12/24 VDC
110-220 VAC
DC/DC Converter
48VDC Battery Bank
AC/DC Inverter
Charge Controller
110 /220 VAC
110 VAC
48 VDC
Grid
2kW
Solar
Potable Water
Waste Brine
Raw Water

PEAK CHASSIS

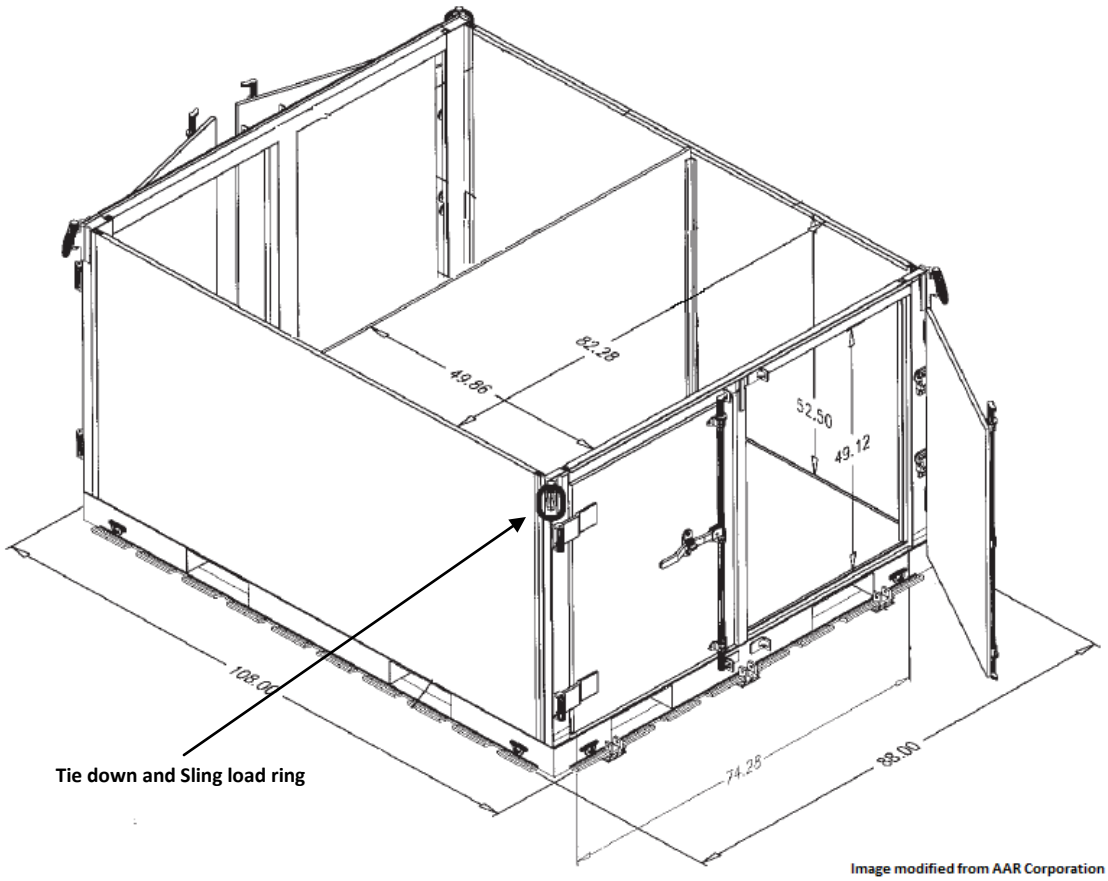
ISU-60 Container (NSN 8145-01-465-3629)

The PEAK components are packed inside an ISU-60 container (NSN 8145-01-465-3629) for storage and transportation. ISU stands for internal airlift/helicopter slingable container unit. The ISU-60 is a standard DOD container manufactured by AAR Mobility Systems and is part of the Equipment Deployment and Storage System (EDSS). Per US Army FM 55-80 Army Container Operations, the ISU containers provide weather resistant storage and transport but do not meet ANSI/ISO structural standards. CSC restrictions do not apply to containers specially designed for air transport; however, the container is certified for internal or external helicopter transport and for all AMC transport aircraft. If transported aboard a ship, the ISU should be carried as secondary loads. AAR's ISU Containers, P/N Series 56000, have been certified by The U.S. Department of Air Force for Air Transportability. The U.S. Army Soldier Systems Center (Natick) has certified the ISU-90 series and ISU-60 series containers for Helicopter Sling Load (HSL). The container is aircraft certified for the C-130, C-5, C-17, KC-10 and CRAF aircraft, and numerous commercial aircraft. Relevant container information may be found at http://www.aarcorp.com/gov/Mobility/Containers/containers_standard.htm.

PEAK utilizes a custom designed trailer for movement of the ISU-60, however the ISU-60 may be transported by other military and commercial transportation systems with the capabilities to support the laden ISU-60 and its dimensions. All components required to operate PEAK are located within the ISU-60. The storage configuration of the components within the ISU-60 is optimized to lower the vertical center of gravity and distribute the load laterally across the base of the ISU-60 in order to limit the rollover risk when loaded on the PEAK trailer. The PEAK configuration places the main site power component and diesel generator on one side of the container, and places the communications, water purification, and remote site power systems on the other side of the container.

General Characteristics of ISU-60:

- Length:……108 inches
- Width:……..88 inches
- Height: :……...60 inches
- Max Payload Capacity:……10,000 lbs
- Tare Weight:…… 1300 lbs
- PEAK Loaded Weight:…….4800 lbs
- All aluminum extruded, mechanically fastened base (eliminates bonded base delamination issues).
- Four-way forkliftable with oversize forklift tubes; tube size 13 -3/4 inch x 4-1/2 inch.
- Intermodal – transportable by air, land, sea, or rail.
- Weather, dust and sand proof structures.



ISU-60 Dimensions—Illustrated

ISU-60 Load Plan

WARNING

Serious injury to personnel and significant damage to personnel may occur if proper lifting procedures including the numbers of personnel required are not followed. Always ensure proper safety equipment is worn and the appropriate numbers of personnel are available to assist loading/unloading.

WARNING

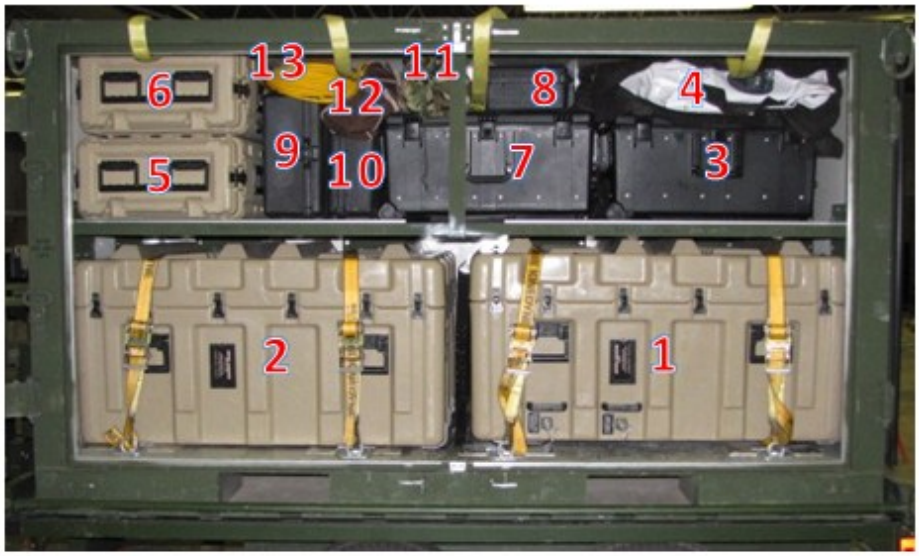
Serious injury to personnel and significant damage may occur due to items shifting during transport and falling out of the ISU-60. Always open the ISU-60 doors slowly and do not place operators in the area immediately forward of the door.

The following section contains the load plan for the PEAK within the ISU-60. Many items within the kit exceed a single man lift. It is imperative that personnel loading and unloading the contents of the ISU-60 observe proper lifting procedures and utilize the appropriate numbers of personnel. The table below provides as list of the heaviest items. This list does not take into account the placement of the equipment in the ISU-60. Items located above the operators head, although lighter than those listed below, may require multiple personnel.

Item	Weight (Each)	# personnel required
Aspen 2000DM Water Purifier	420 lbs (191 kg) (Dry Weight)	6
Aspen 2000DM Support Case	200 lbs (91 kg)	4
Braille OASYS 3kWh Battery Pack	98 lbs (44 kg)	2
MEP-531A Diesel Generator	152 lbs (69 kg)	4
Antenna Mast Bag	77 lbs (35 kg)	2
Main Site Communications Box	62 lbs (28 kg)	2
Remote Site Communications Box	62 lbs (28 kg)	2

Load Plan pictures are provided below. The numbers correspond to the load sequence. The communications side and the power side may be loaded simultaneously.

PEAK LOAD PLAN – COMM. SIDE – PICTURE 1



1. Aspen 2000DM ROWPU
2. Aspen 2000DM Support Case
3. Remote Site Battery (Wheels to the middle of the ISU-60; handle toward the doors of the ISU-60)
4. Water Bladder
5. Remote Site BTS
6. Local Site BTS
7. Remote Site Battery (Wheels to the middle of the ISU-60; handle toward the doors of the ISU-60)
8. Remote Site Handheld Case
9. Remote Site MSC Case
10. Local Site Handheld Case
11. Combat Tent
12. Accessory Bag
13. Extension cords

PEAK LOAD PLAN – COMM. SIDE – PICTURE 2

14. Antenna Bag
15. Antenna Bag

(NOTE: Ratchet strap the antennas in place.)

16. Local Site MSC Case

(NOTE: Ratchet strap the MSC Case in place.)

PEAK LOAD PLAN – COMM. SIDE – PICTURE 3

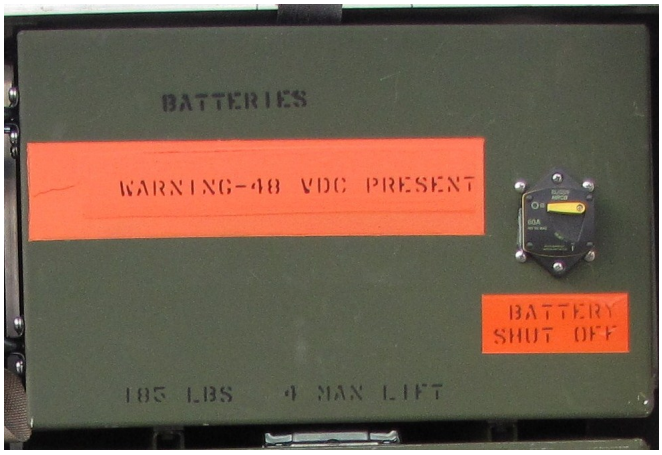
17. Solar Array Cable Bag

(NOTE: Ratchet strap the solar bag and the BTS.)

PEAK LOAD PLAN – PWR. SIDE – PICTURE

1. MEP-531A Generator (May be loaded and unloaded at any time)
2. Main Site Battery Cases (Not to be removed by the Operators)
3. 120 VAC Control Box (Not to be removed by Operators)
4. 220 VAC Control Box (Not to be removed by Operators)
5. Solar Panels
6. Personal Protective Equipment (PPE) (NOTE: Commercial tool kit and Solar Panel stakes are located behind the PPE)
7. Folding Table

PEAK POWER


BATTERIES
WARNING-48 VDC PRESENT
BATTERY
SHUT OFF
185 LBS 4 MAX LIFT

120 VAC, 60 Hz:
MEP-531A (DEWEY)
(NSN 6115-01-435-1565) (EIC: LKA)

a. Generator Set.

Model Numbers:
2 kW 120 VAC Military Tactical Generator Set MEP-531A
2 kW 28 VDC Military Tactical Generator Set MEP-501A

National Stock Numbers:
MEP-531A ..... NSN 6115-01-435-1565
MEP-501A ..... NSN 6115-01-435-1567

Overall Length
MEP-531A ..... 29.5 in. (750 mm)
MEP 501A ..... 29.5 in. (750 mm)

Overall Width
MEP-531A ..... 16 in. (406 mm)
MEP-501A ..... 16 in. (406 mm)

Overall Height
MEP-531A ..... 21.7 in. (550 mm)
MEP-501A ..... 21.7 in. (550 mm)

Dry Weights
MEP-531A ..... 143.1 lb (64.9 kg)
MEP-501A ..... 123.5 lb (56.0 kg)

CHAPTER 1 SPECIFICATIONS (cont)

b. Operating Environment.

Temperature Range	-51 to 122° F (-46 to +50° C)
Incline Angle	15° max.

c. Diesel Engine.

Manufacturer	Yanmar
Model	L48AE-DEG
Type	Single cylinder, four cycle, naturally-aspirated diesel
Stroke	2.2 in. (55 mm)
Displacement	12.88 cu in. (0.211 l)
Compression Ratio	19.9:1
Rating	4.2 HP @ 3600 RPM
Engine Operating Speed	
No Load	3750 RPM
Full Load (± 30 RPM)	3600 RPM
Altitude Degradation, 4000 to 8000 ft	1.3% per 328 feet (100 m)
Cold Weather Starting System Use	When temperature is 23°F (-5°C) or below

d. Diesel Engine Cooling System.

Type	Air cooled by fan integral with flywheel

e. Diesel Engine Lubricating System.

Type	Full flow, circulating pressure
Capacity	0.85 qt (0.80 l)
Oil Pump Type	gerotor
Normal Operating Pressure	25-60 psi
Filter Type	reusable strainer
Pressure Indicating System	None

f. Fuel System.

Type of Fuel	DL-1, DL-2, or JP8
Fuel Tank Capacity	1.6 gal. (6.1 l)
Fuel Consumption Rate	0.333 gal./hr (1.26 l/hr) @ 100% load
Full Tank Consumption	4.8 Hours @ 100% load

g. Diesel Engine Starting System.

Manual	Recoil mechanism
Electric (Power supplied via NATO slave receptacle)	Starting motor
Manufacturer	Yanmar
Model	S114-414A
Rating	24 VDC

CHAPTER 1 SPECIFICATIONS (cont)

h. Alternator.

MEP-531A:

Manufacturer	Dewey Electronics Corporation
Type	Rotating field synchronous
Load Capacity	2 kW
Voltage Output	120 VAC single phase 2 wire and ground (bonded to frame)
Power Factor	1.0
Load Recovery Time (Voltage):	
NL to FL	3.0 seconds
FL to NL	3.0 seconds
Load Recovery Time (Frequency):	
NL to FL	4.0 seconds
FL to NL	5.0 seconds
Cooling	forced air
Lubrication Requirements	none
Drive Type	direct coupling
Duty Classification	continuous

MEP-501A:

Manufacturer	Balmar Products Inc.
Type	Brush AC rectified to DC
Load Capacity	2 kW
Voltage Output	28 VDC
Load Recovery Time (Voltage):	
NL to FL	1.0 seconds
FL to NL	0.5 seconds
Cooling	forced air
Lubrication Requirements	none
Drive Type	direct coupling
Duty Classification	continuous

i. Safety Devices.

Low Engine Oil Pressure:

Trip Pressure (Range)	12-18 psi
Voltage Rating	24 VDC
Current Rating	5 amps
Method	Electrically-operated solenoid with mechanical link to fuel governor

ARMY TM 9-6115-673-13&P
AIR FORCE TO 35C2-3-512-1

EXTRACTED FROM FULL ARMY MANUAL FOR PEAK CHAPTER 2

OPERATING INSTRUCTIONS

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2.1. SCOPE.

This section describes operator controls and indicators for the generator set.

2.2. CONTROLS AND INDICATORS.

The operator controls and indicators are identified in Figure 2-1 and Table 2-1.

Table 2-1. Operator Controls and Indicators

Key	Control or Indicator	Function
1	Recoil Starter	When pulled, turns-over engine flywheel/crankshaft to start diesel engine.
2	Air Intake Cover	Directs airflow into the engine air intake system. In cold weather, the cover is positioned to allow air which has been warmed by the hot muffler to flow into diesel engine air intake system. Normally, the cover is positioned to allow ambient air to flow into the diesel engine.
3	Decompression Lever "A"	When depressed, releases compression in the diesel engine combustion chamber to allow for manually pull starting the engine. Lever automatically returns to its up ("off") position when recoil starter is pulled.
4	RUN Lever (Black)	Pushed - Enables fuel flow to diesel engine fuel injection pump for starting and running generator set.

Table 2-1. Operator Controls and Indicators - Continued

Key	Control or Indicator	Function
5	STOP Lever (Red)	Depressed - Disables fuel flow to diesel engine fuel injection pump to stop engine.
6	Fuel Shutoff Valve	↓O (Open) - Allows fuel to flow from fuel filter to diesel engine fuel injection pump. ↑C (Closed) - Shuts off fuel flow from fuel filter to fuel injection pump.
7	Fuel Filter Bleed Screws (2 ea)	Bleed air from the generator set fuel system.
8	Oil Fill Cap/Dipstick	Check and add lubrication oil to diesel engine (one on each side of engine).
9	START-PREHEAT/ PREHEAT/OFF/ START Rotary Switch	START-PREHEAT - Selected and held, energizes 24-VDC starting circuit and air intake heaters when 24 VDC power is connected to NATO slave receptacle. When released, spring loaded switch returns to OFF position. PREHEAT - Selected and held, energizes air intake heaters mounted between air cleaner and diesel engine air intake manifold when 24 VDC power is connected to NATO slave receptacle. When released, spring-loaded switch returns to OFF position. OFF - Disables diesel engine 24 VDC starting circuit. START - Selected and held, energizes 24 VDC diesel engine starting circuit when 24 VDC power is connected to NATO slave receptacle. When released, spring-loaded switch returns to OFF position.
10	ON-OFF Load Circuit Breaker	ON - Closes AC circuit to supply power to load terminals. OFF - Opens AC circuit to shut off power to load terminals.
11	NATO Slave Receptacle	Supplies power to diesel engine start and air intake heater circuits when connected to external 24 VDC power source via a NATO power cable.
12	VOLTS Meter (AC MEP-531A) (DC MEP-501A)	Indicates output voltage of generator set. Normal reading for MEP-531A is 120 VAC and for MEP-501A is 28 VDC.
13	%LOAD Meter	Indicates generator set load current as a percent of its rated current. Normal reading is dependent on load demand from 0 to 125 percent.
14	HOURS Meter	Indicates total diesel engine operating hours.
15	VOLTAGE ADJ. Potentiometer	Adjusts generator set voltage from 114 V to 126 VAC (MEP-531A) or from 26.6 to 32.2 VDC (MEP-501A).

Table 2-1. Operator Controls and Indicators - Continued

Key	Control or Indicator	Function
16	GFCI Receptacle (MEP-531A only)	Provides 15 Amp, 120 VAC power. Receptacle features a Ground Fault Circuit Interrupter (GFCI), which protects the generator set from power surges originating from powered equipment and two grounded convenience receptacles. PRESS TO TEST pushbutton tests the GFCI feature of the receptacle. PRESS TO RESET pushbutton resets the GFCI breaker.
17	INST. Fuse	Protects the voltmeter (VOLTS) and frequency (HERTZ) meter during an over current condition. A spare fuse is contained in a fuse holder to left of primary fuse.
18	HERTZ Frequency Meter (MEP-531A only)	Indicates generator set output frequency. This meter may also be used to determine the engine rpm by multiplying the reading by 60 (e.g. 60 Hertz x 60 = 3600 rpm). Normal reading is 60 Hz.
19	EMI Filter (MEP-531A) Load Terminals (MEP-501A and Mechron Sets)	Provide connection point for load cables. Load terminals "L" and "N" (MEP-531A) and "+" and "-" (MEP-501A) are split lug connectors for ease in connecting load cables.
20	Ground Stud	Provides location for grounding generator set to suitable ground.
21	Rubber Plug	Cold Weather Start, Engine Preservation

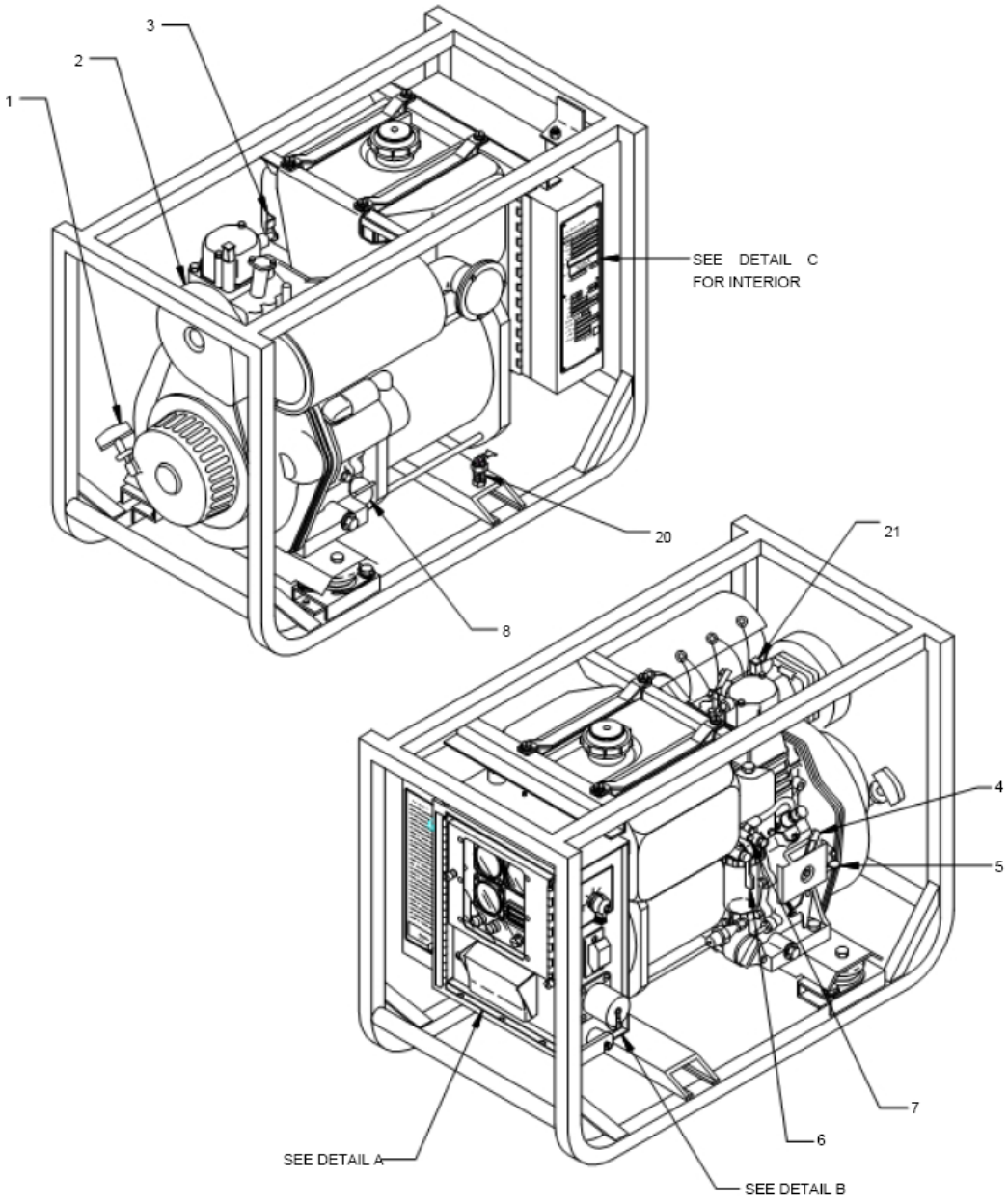
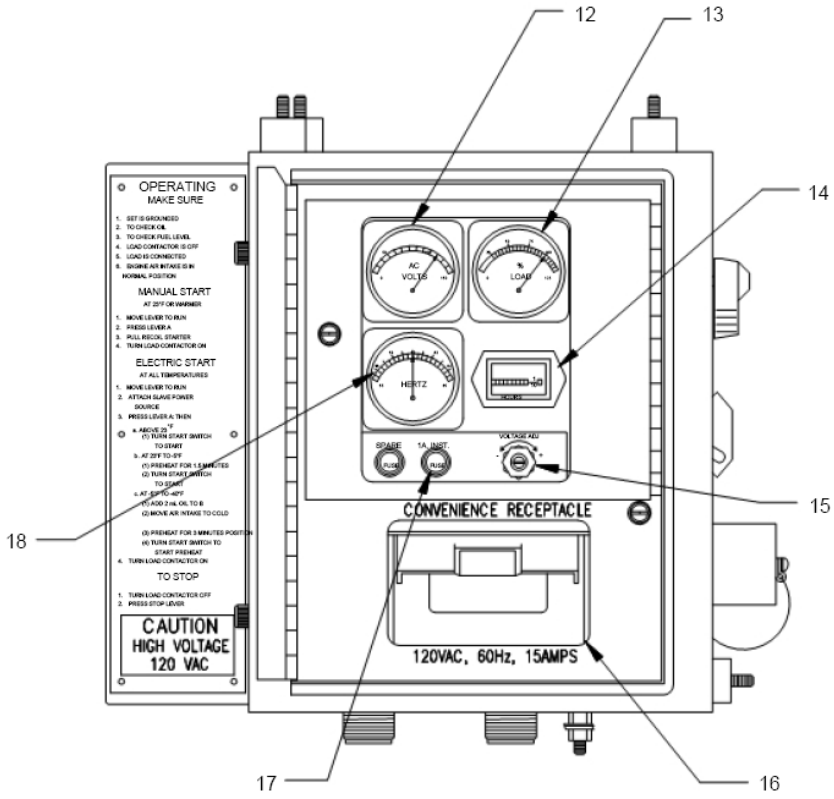
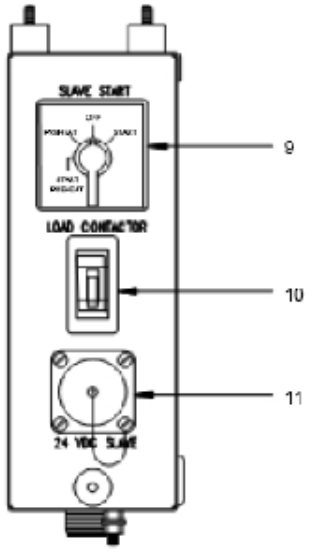


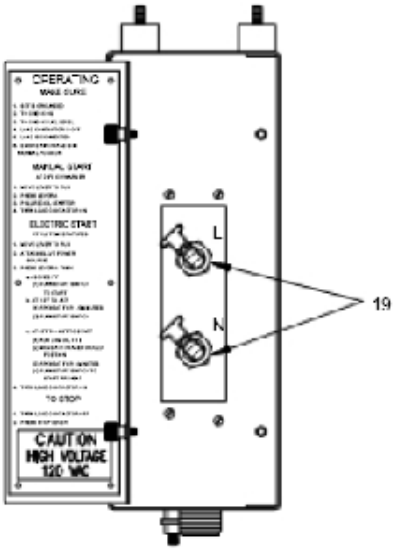
Figure 2-1. Operator's Controls and Indicators (Sheet 1 of 4)



DETAIL A
MEP-531A



DETAIL B
MEP-531A



DETAIL C
MEP-531A

Figure 2-1. Operator's Controls and Indicators (Sheet 2 of 4)

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2.3. GENERAL.

Preventive Maintenance Checks and Services (PMCS) are those scheduled procedures that are essential to the efficient operation of the equipment. PMCS prevent possible damage that might occur through neglect or failure to observe warning symptoms on time. Ensure all noted discrepancies are corrected.

WARNING

Remove metal jewelry when working on electrical system/components. Failure to observe this warning could cause severe personal injury from electric shock.

2.4. OPERATOR PMCS.

Table 2-2 lists all scheduled maintenance tasks required for the generator set components and accessories. The columns of Table 2-2 are described below.

a. Column (1) - Item Number (Item No.).

This column contains a number for each procedure to be performed. When reporting malfunctions or failures on DA Form 2404, [Equipment Inspection and Maintenance Worksheet, (or DA Form 5988E) enter this number in the "TM Item No." column (refer to DA PAM 738-750)].

b. Column (2) - Interval (Interval B, D, A).

These columns tell when to perform a procedure. A dot in a column tells which procedures apply. Some procedures will have more than one dot.

c. Column (3) - Item To Be Inspected.

This column has the name of the item to be inspected.

d. Column (4) - Procedure.

This column tells how to do the required checks and services. Carefully perform these instructions in the order listed.

e. Column (5) - Equipment Is Not Ready/Available If.

This column states conditions that will cause the equipment not to be ready for operation.

2.5. PREVENTIVE MAINTENANCE PROCEDURES.

NOTE

Within designated intervals, these checks are to be performed in the order listed. If the generator set must be kept in continuous operation, check and service only those items that can be accessed without interrupting operations. Complete checks and services when the generator set is shut down.

a. Before You Operate.

Perform before (B) PMCS in Table 2-2. Observe WARNINGS and CAUTIONS contained in this manual and on plates installed on equipment.

b. While You Operate.

Perform during (D) PMCS in Table 2-2. Observe WARNINGS and CAUTIONS contained in this manual and on plates installed on equipment.

c. After You Operate.

Perform after (A) PMCS in Table 2-2. Observe WARNINGS and CAUTIONS contained in this manual and on plates installed on equipment.

d. Order.

Always do preventive maintenance in the same order.

e. Reporting and Correcting Deficiencies.

If your generator set does not perform as required, refer to troubleshooting for possible problem. Any malfunctions, failures, or discrepancies shall be recorded on DA Form 2404 or DA Form 5988E and reported to higher-level maintenance, refer to DA PAM 738-750.

f. Special Instructions.

The following guidelines have been provided to help you in classifying leaks observed while performing PMCS.

Class I. Seepage of fluid as indicated by wetness or discoloration not great enough to form drops.

Class II. Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked.

Class III. Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

CAUTION

Equipment operation is allowable with minor leakages (Class I or II). Of course, consider the fluid capacity of the item/system being necked/inspected. When in doubt, notify maintenance.

While operating with Class I or Class II leaks, continue to check fluid levels as required in your PMCS. All leaks should be reported to maintenance.

Table 2-2. Operator Preventive Maintenance Checks and Services

NOTE

Within designated intervals, these checks are to be performed in the order listed.

B-Before operation D-During operation A-After operation

(1) Item No.	(2) Interval B	D	A	(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
				GENERATOR SET		
(1)	•			Control Panel	Check ON-OFF load circuit breaker for damage. 	ON-OFF load circuit breaker damaged.
	•		•	Instrument Panel	Check window protecting instrument panel for damage.	
	•		•		Check all indicators and controls for damage and missing parts.	Indicators or controls damaged or missing.
		•			Check all indicators for proper operation.	VOLTS Meter or HERTZ frequency meter (MEP-531A) inoperative.
(2)	•		•	Identification and Instruction Plates	Check all identification and instruction plates for damage, security, and legibility. Refer to Figure 2-9.	Safety or operation instruction decal missing or illegible.

Table 2-2. Operator Preventive Maintenance Checks and Services (Continued)

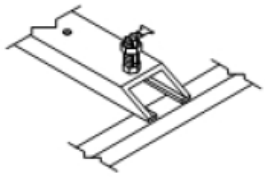
(1) Item No.	(2) Interval B	D	A	(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
(3)	•			Load Terminals	Inspect load terminals for damage and security. 	Load terminals damaged or loose. Retaining clips missing or damaged.
(4)	•	•		Ground terminal stud	Inspect ground terminal stud for damage. Ensure generator set is properly grounded. 	Generator set ground terminal stud is damaged or generator set not properly grounded. Retaining clip missing or damaged.

Table 2-2. Operator Preventive Maintenance Checks and Services (Continued)

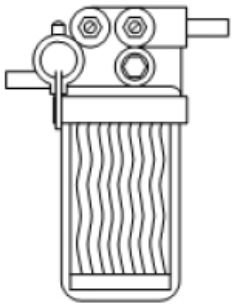
(1) Item No.	(2) Interval B	D	A	(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
(5)	•			Air Intake Cover Wing Nut	Check air intake cover wing nut for security. Tighten if necessary. 	Air intake cover cannot be secured.
(6)	•		•	Filter Assembly, Fuel	Inspect fuel filter assembly for damage and security. Check fuel filter bowl for water or other contaminants. 	Fuel bowl contains water or contaminants.

Table 2-2. Operator Preventive Maintenance Checks and Services (Continued)

(1) Item No.	(2) Interval B	D	A	(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
(7)	•	•	•	Fuel System	Inspect fuel system for loose or missing fuel line clamps, damaged fuel lines, and leaking/damaged fuel tank. Check for evidence of fuels leaks.	Any fuel leaks, or damaged, loose, or missing parts.
	•	•	•		Check fuel level and if necessary, service fuel tank to red line on fuel strainer. Ensure fuel tank fill neck strainer is not clogged or damaged.	
					The following fuels may be used between -51 and 122°F (-46 and 50°C): (a) DL-1 (A-A-52557) [-26° to 0°F (-32 to -18°C)] (b) DL-2 (A-A-52557) [0° to 122°F (-18 to 50°C)] (c) JP-8 (MIL-DTL-83133) [-26°F to -51°F (-32°C to -46°C)]	

Table 2-2. Operator Preventive Maintenance Checks and Services (Continued)

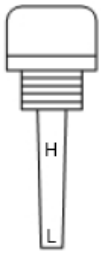
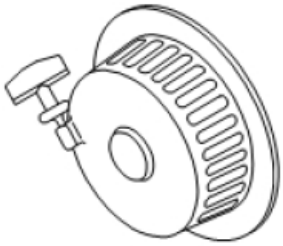
(1) Item No.	(2) Interval B	D	A	(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
				DIESEL ENGINE		
(8)	•		•	Crankcase Oil	Ensure generator set is level and check diesel engine lubricating oil level using oil fill cap/dipstick (do not screw in oil fill cap/dipstick when checking oil level). Refer to Figure 2-1, item 8 for the locations of oil fill cap/dipstick. Add oil if required for the following operating environments: MIL-PRF-46167, 0W30 [-40° to 0°F (-40° to -18°C)] MIL-PRF-2104, 15W30 [0° to 120°F (-18° to 49°C)] 	
	•	•	•		Inspect the diesel engine and surrounding area for oil leaks.	Class III oil leaks.

Table 2-2. Operator Preventive Maintenance Checks and Services (Continued)

(1) Item No.	(2) Interval B	D	A	(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
(9)	•	•	•	Cylinder head cooling fins and recoil starter cover	Inspect cooling fins and air intake slots in recoil starter cover for damage and debris restricting air flow over and through cooling fins. Remove debris. Check recoil starter assembly for damage and operation. 	Any damaged, loose, or missing parts.
(10)	•			Spark Arrestor	Check daily for carbon buildup.	Spark arrestor is blocked or buildup is present.

2.7. ASSEMBLY AND PREPARATION FOR USE.

a. Installation of Ground Rods.

WARNING

Never attempt to start the generator set if it is not properly grounded. Failure to observe this warning could result in serious injury or death by electrocution.

(1) Insert ground cable (6 AWG min.) through slot on frame mounted terminal stud GND. Hold terminal body hex with one wrench and tighten terminal nut on terminal stud.

(2) Drive an eight-foot (or longer) ground rod into ground until clamp on top of ground rod is just above surface.

(3) Insert ground cable through ground rod clamp and tighten clamp screw.

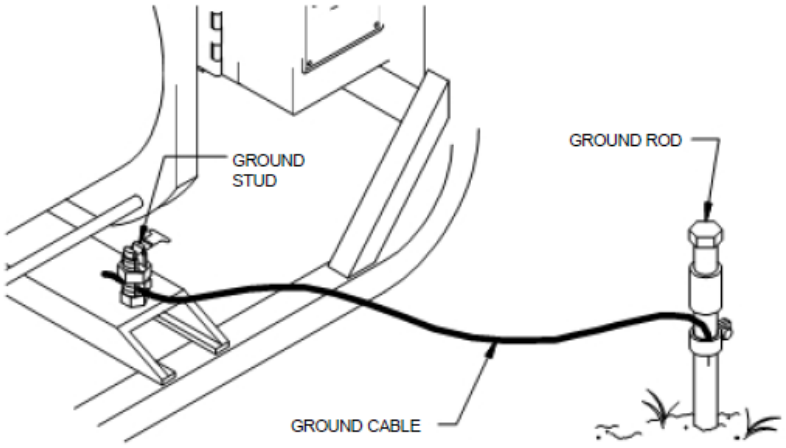


Figure 2-2. Grounding Connections (Typical Installation)

2.8. INITIAL ADJUSTMENTS AND CHECKS.

The diesel engine must be broken-in, avoiding heavy loads (no greater than 75%), for a period of at least twenty (20) hours to ensure proper operation of the generator set. After the initial break-in period, intake and exhaust valve clearances must be checked and adjusted, the head nuts torque must be checked, and engine lubricating oil changed. Contact unit maintenance.

2.9. OPERATING PROCEDURES.

WARNING

High voltage is produced when this generator set is in operation. Use care when working around an open control panel with the generator set operating. Improper operation and/or failure to follow this warning could result in personal injury or death by electrocution.

WARNING

Exhaust discharge contains deadly gases. Do not operate generator set in enclosed area unless exhaust discharge is properly vented outside. Position as far away from personnel, shelters, and occupied vehicles as possible. Failure to observe this warning could result in severe personal injury or death due to carbon monoxide poisoning.

WARNING

The noise level of this generator set when operating could cause hearing damage. Hearing protective devices must be worn when operating or working within 13 feet of the generator set when it is running. Failure to observe this warning can result in personal injury.

WARNING

Hot fueling of generator sets while they are operating presents a safety hazard and should not be attempted. Hot engine surfaces and sparks produced from the engine and generator circuitry are possible sources of ignition. Failure to observe this warning could result in severe personal injury or death.

WARNING

High fuel pressure is generated as a result of operation of the generator set. High-pressure leaks could cause severe personal injury or death.

CAUTION

If the diesel engine starts racing (overspeeding) at startup or during operation, there is a governor control malfunction. Depress the engine STOP lever immediately to avoid possible damage to the diesel engine caused by excessive overspeeding.

CAUTION

Check stenciled or painted markings on air intake cover to ensure it is in the proper position. Normal position of cover allows ambient temperature air to flow into the diesel engine. Failure to place air intake cover in normal position, except in temperatures below -5°F, may cause engine oil breakdown, engine overheating, or catastrophic engine failure.

NOTE

Under normal operating conditions, generator set will vibrate and "walk" on hard surfaces. Block generator set appropriately.

a. Manual Starting [23°F (-5°C) to 122°F (50°C)].

WARNING

Never attempt to start the generator set if it is not properly grounded. Failure to observe this warning could result in serious injury or death by electrocution.

(1) Ground generator set, refer to paragraph 2.7.a.

(2) Switch ON-OFF load circuit breaker (10, Figure 2-1) to OFF.

WARNING

Never attempt to connect or disconnect load cables while the generator set is running. Failure to observe this warning could result in severe personal injury or death by electrocution.

(3) Connect load cables to load terminals, refer to paragraph 2.7.b.

(4) Perform all B (Before) PMCS procedures, refer to Table 2-2.

(5) Check that air intake cover (2) is in NORMAL operating (summer) position as indicated on top of filter cover (Figure 2-5).

(6) Ensure that fuel shutoff valve (6, Figure 2-1) is in the ↓O (open) position.

(7) Pull recoil starter (1) slowly. Stop when it feels tight.

(8) Depress decompression lever "A" (3).

(9) Move engine RUN lever (4) to RUN position (Figure 2-6).

CAUTION

A condition known as reverse rotation can occur if the recoil starter rope (1, Figure 2-1) is pulled out too slowly. If the engine rotation reverses, you will hear abnormal noises caused by the reverse rotation of the oil pump. DEPRESS THE ENGINE STOP LEVER IMMEDIATELY. Failure to do so will cause the engine bearings to seize due to lack of lubrication.

(10) Take up the slack in recoil starter rope (1) and pull rope quickly and all the way out.

(11) If the engine fails to start, repeat steps 7 thru 10.

(12) If engine still fails to start after two attempts, refer to operator troubleshooting tables in Chapter 3.

(13) Check all gauges for proper indications as follows, refer to Figure 2-1:

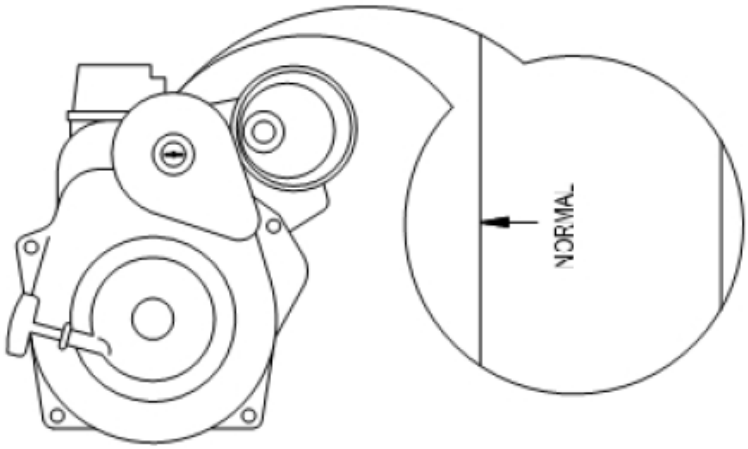


Figure 2-5. Air Intake Cover, Normal Operation

NOTE

If any gauge indicates an improper value, refer to the operator troubleshooting tables in Chapter 3.

(a) VOLTS AC meter (12) for 120 VAC (MEP-531A) or VOLTS DC meter (12) for 28 VDC (MEP-501A).

(b) HERTZ frequency meter (18) for 60-63 Hz (MEP-531A).

(c) %LOAD meter (13) under no load condition should read 0 (%). The reading will vary as the demand changes (from 0 to 125 %).

NOTE

Under normal conditions, allow the diesel engine to warm-up for five minutes before applying a load. If necessary, the load can be applied immediately.

(14) Switch ON-OFF load circuit breaker (10, Figure 2-1) to ON to apply load.

(15) Perform all D (During) PMCS procedures in accordance with Table 2-2.

e. Stopping Procedure.

(1) Switch ON-OFF load circuit breaker (10, Figure 2-1) to OFF position and allow engine to run approximately 3 minutes with no load.

(2) Press engine STOP lever (5).

(3) Perform all A (After) PMCS procedures in accordance with Table 2-2.

2.11. PREPARATION FOR MOVEMENT.

(1) Shut down generator set. Refer to paragraph 2.9.e.

(2) Disconnect load cables (Figure 2-3).

(3) Disconnect ground cable (Figure 2-2) and remove ground rods.

(4) Secure all generator set access doors and panels.

(5) For initial set up after movement, refer to paragraph 2.7 for assembly and preparation for use.

PEAK Main Site Power

WARNING

The PEAK unit operator will encounter various pinching hazards during setup and breakdown. These hazards are marked with a Pinch Point label and warnings should be heeded to prevent injury.

WARNING

Solar panels generate DC electricity ANYTIME they are exposed to sunlight. Caution must be taken to never short circuit solar panels or electrical shock may occur. Panels stop producing electricity immediately when they are removed from sunlight. If service on the electrical portion of the array is necessary during daytime hours it is possible to shade the array with a tarp and render it electrically inert.

CAUTION

Glass solar panels will break if dropped on corners.

CAUTION

The PEAK unit contains many components that are heavy and require multiple person lift. Use provided lifting handles and test lift components prior to actual lifting to make sure enough personnel are available to safely lift components.

Setting up the solar array

1. Unlock the POWER side of the PEAK ISU-60. The factory lock combination for all locks is 2345.

2. Locate solar panel storage area in the upper left corner of the POWER side of the PEAK ISU-60

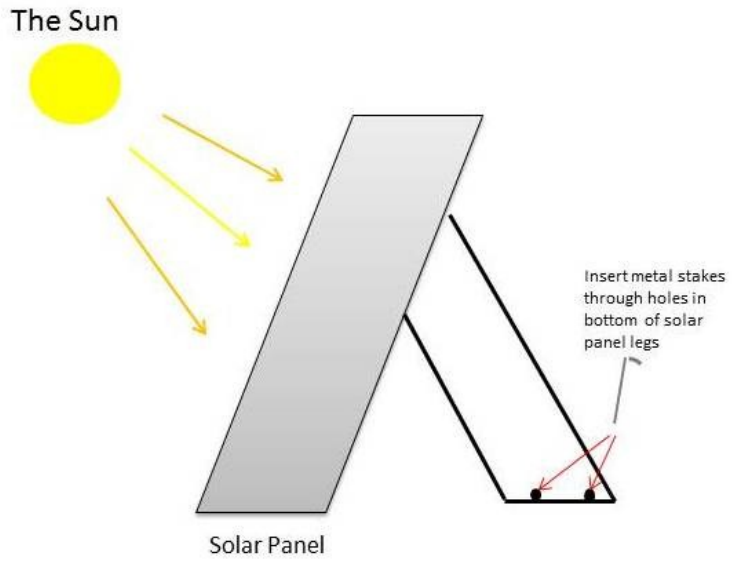
3. Remove the ratchet tie down straps securing the solar panels. Using two people, carefully slide solar panels out of their storage location and lay them gently on a smooth surface glass side up (grass, soil, pavement, etc.). Take care not to pinch fingers or solar panel pigtail wires.

4. Find a flat location to set up solar arrays within 50 'of the PEAK power side of the ISU-60. Array Locations should be unshaded.

5. Unfold solar panel legs from the back of each solar panel and stand them up with the glass face of the panel towards the sun. Take care to note the stowed position of frame legs inside the solar panel as this will be helpful in repacking the panel legs after use. Arrange solar panels in two lines of six panels each placing the panels edges side by side.

6. Using the metal tent stakes located in the red plastic box labeled "stakes" anchor each solar panel to the ground. The stakes fit through anchor holes on the bottom of the panel leg and can be driven into the ground with the supplied hammer. If the panels are deployed on a hard surface that prevents the use of stakes they must be ballasted using sand bags.

7. If the panels are deployed on a hard surface that prevents the use of stakes, add sand bags or similar ballast over ballast bar to prevent array from moving is strong winds.



8. **ONLY attach the positive (+) and negative (-) electrical cables on the back side of the first two solar panels in the line of 6 panels to each other. The panel pigtail wire lengths will only allow you to make the correct connection.**

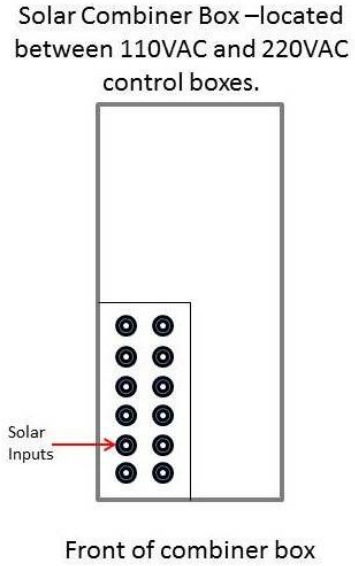
9. Locate solar array cable and lay it out between solar array and control boxes. Array end of the cables is the end with a longer length of exposed black wires. Taking the array end of the cable attach two of the wires to the remaining two loose pigtails from the solar panels connected in step 10. This results in an electrical circuit that has only two solar panels in series.

NOTE: It does not matter which of the black wires on the array cables attach to the two loose solar panel pigtail wires. As long as the plugs fit physically, they will be electrically correct.

Repeat steps 8 and 9 for the remaining ten solar panels making sure that each electrical circuit has only two solar panels in it.

10. Attach the control box end of the array cables to Solar Input receptacles located on the face of the silver Solar Combiner box. This box is located between the 120 VAC and 220 VAC control boxes.

NOTE: It does not matter which of the black wires on the array cables attach to the control box array receptacles. As long as the plugs fit physically, they will be electrically correct.

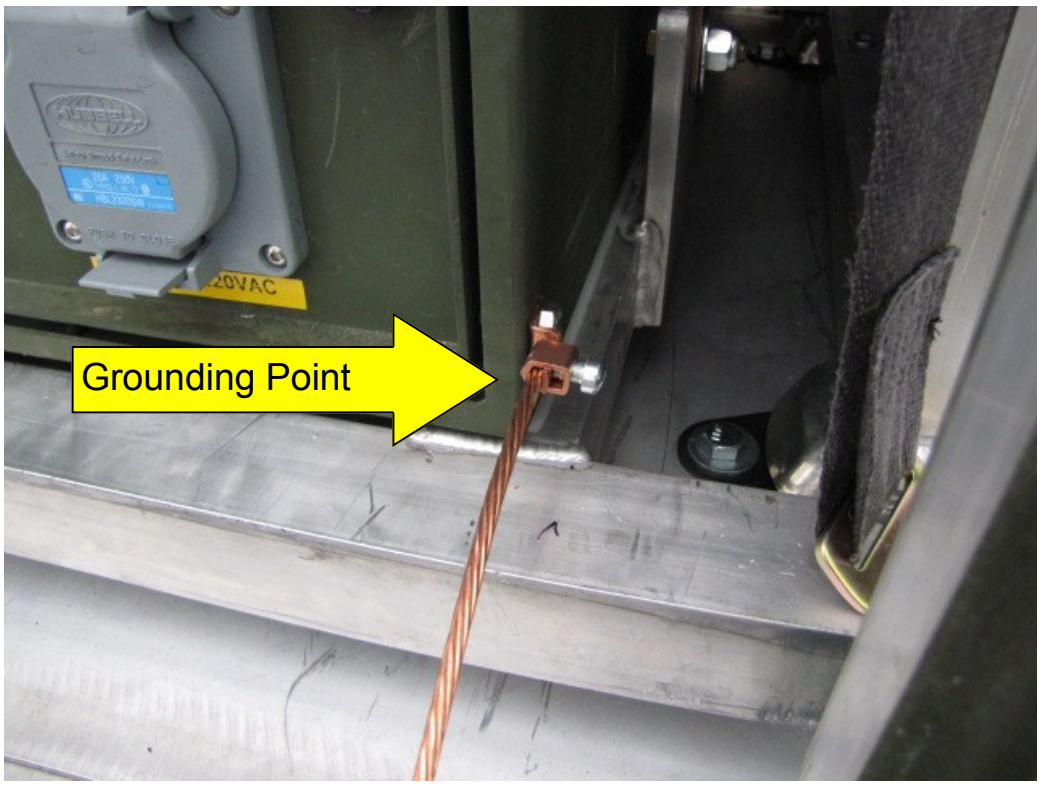


11. Solar panels should be broken down and stored in the reverse order of setup. Solar panels MUST be stowed in the solar panel storage area GLASS DOWN. This is to prevent the panel legs from dropping and breaking the glass of the panel below.

12. When all panels are stowed in the panel storage area the ratchet straps should be snugged down to prevent movement in transport.

Grounding the POWER Side of the PEAK ISU-60

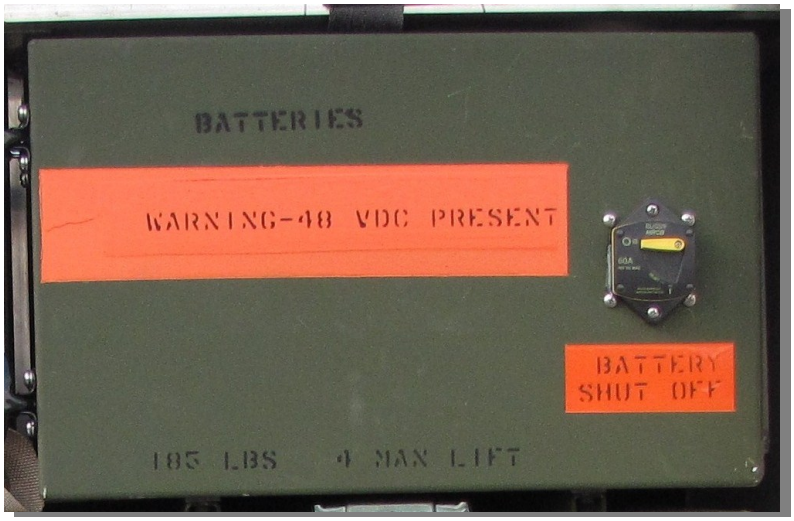
1. Unlock the POWER side of the PEAK ISU-60. The factory lock combination for all locks is 2345.
2. Locate one of the four provided grounding kits (one for generator, one for the POWER side of the ISU-60, and one for each communications antenna)
3. Assemble the grounding rod by screwing the sections together.
4. Using the provided ground wire, attach one end of the wire to the control box grounding point and the other end to the ground rod.
5. Using the supplied slide hammer, drive grounding rod into the earth thereby completing the electrical grounding circuit.



Using PEAK System to Provide AC or DC Electricity

NOTE: Steps 1-3 must be followed prior to using any AC or DC power from the PEAK system

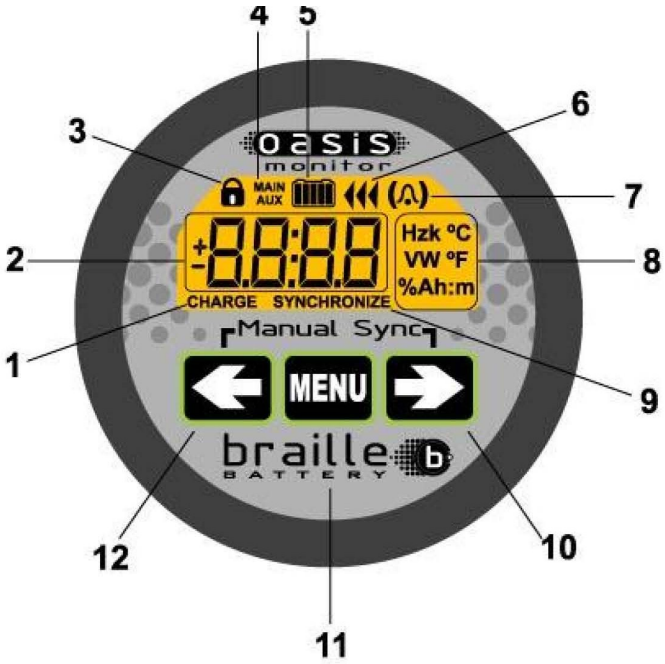
1. Turn on Main Disconnect switches on all three battery boxes as shown in the picture below. Turn on switch by rotating the yellow bar from a horizontal position to a vertical position. This will now provide electrical power to both the upper and lower power control boxes.



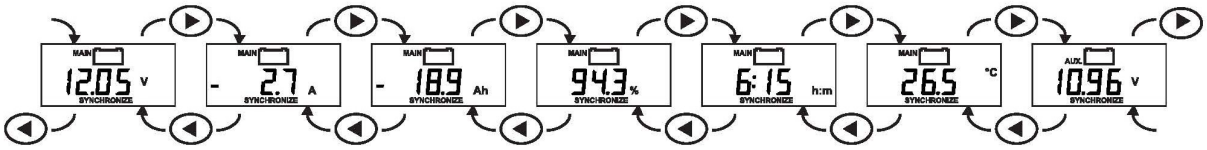
2. On the upper power control box, locate the Solar Charge Controller breaker and turn it on as shown in the picture below. (even if you are not actively charging batteries, turning the Solar Charge Controller breaker on will activate the MATE battery monitor and allow the user to actively monitor the battery bank voltage).

3. On the 220VAC power control box, locate the MATE battery and charging monitor screen and verify battery bank voltage. Press Status/CC/Meter to get to the meter screen and then use the Down/Up buttons to scroll through the various display parameters. See picture below. Battery voltage will be maintained between 42 and 53 VDC. Any battery voltage over 50 VDC represents a fully charged battery bank.

3. On the 120VAC power control box, locate the battery and state of charge monitor screen and verify battery bank voltage. Using the arrow buttons the meter will scroll through the various display parameters. See picture below. Battery voltage will be maintained between 42 and 53 VDC. Any battery voltage over 50 VDC represents a fully charged battery bank.



1. Charge battery indicator
2. Numeric value indicator field
3. Setup lock / Master lock indicator
4. Main battery or Auxiliary battery indicator
5. State-of-charge bar
6. Charging in progress indicator
7. Alarm activated indicator
8. Readout units
9. Synchronize indicator
10. Next value or Right key (>)
11. Menu key
12. Previous value or Left key (<)



battery voltage

Charge / discharge current. '-' sign represents discharge current.

Amount of consumed Amp-hours.

State-of-charge (SOC) in percent.

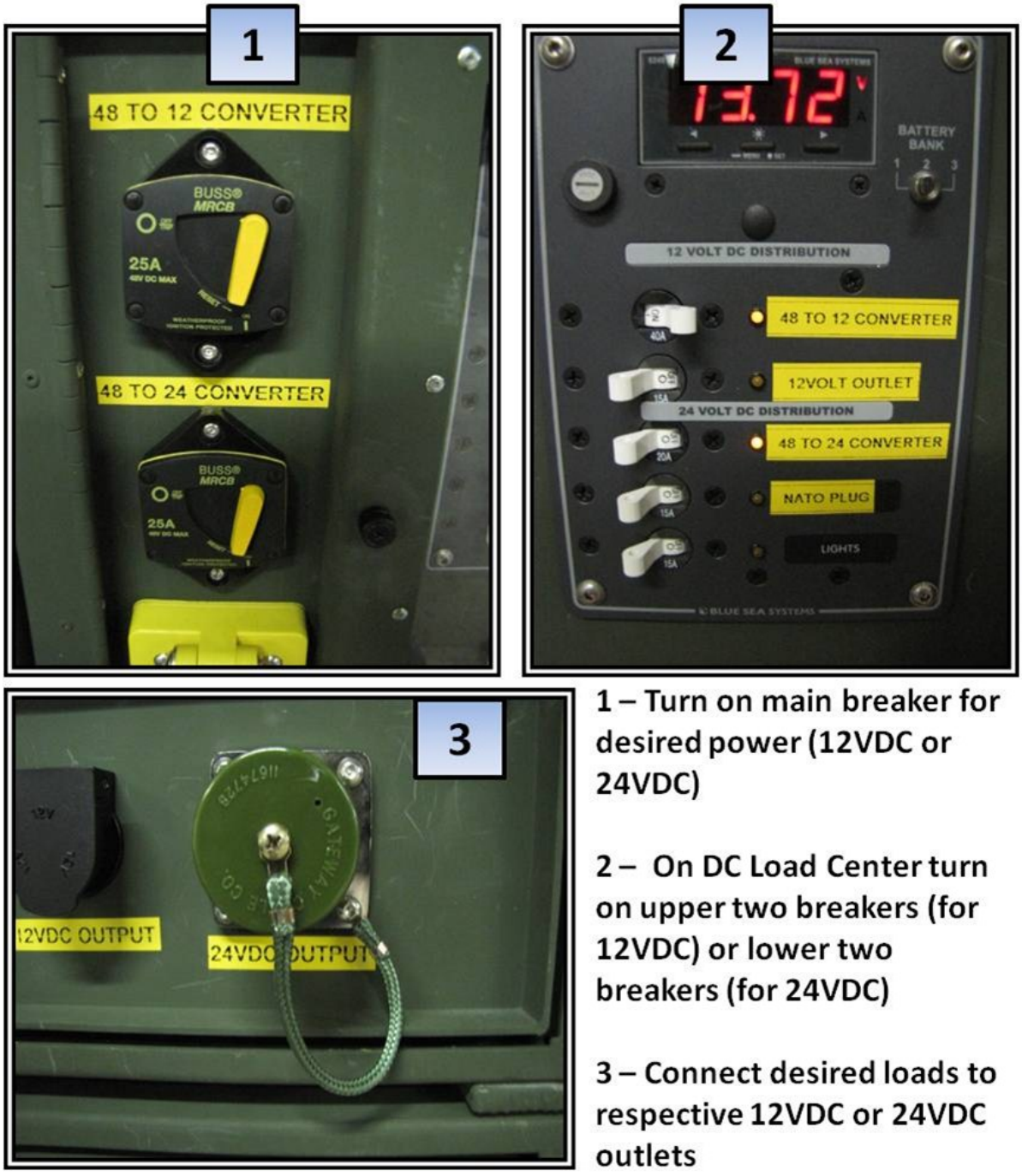
Time remaining until battery recharge is necessary. Displays "----" when charging.

Battery temperature (optional).

Auxiliary battery voltage (optional).

Preparing PEAK System to Provide DC Electricity

Following the sequence shown in the picture below, switch on and operate DC loads.



1 – Turn on main breaker for desired power (12VDC or 24VDC)

2 – On DC Load Center turn on upper two breakers (for 12VDC) or lower two breakers (for 24VDC)

3 – Connect desired loads to respective 12VDC or 24VDC outlets

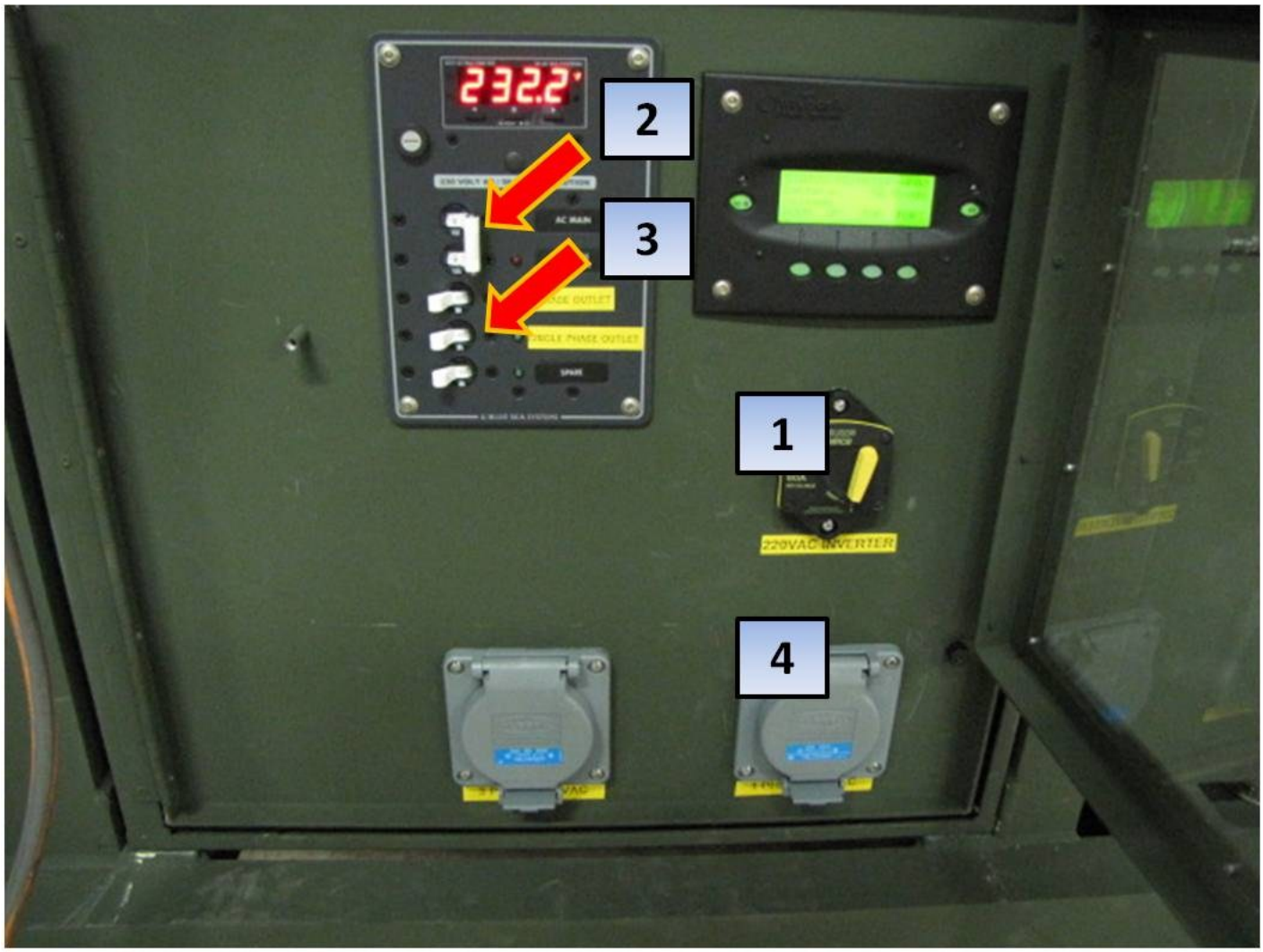
Using PEAK System to Provide 120VAC Electricity

Locate the power control box. Following the sequence shown in the steps below.

1. Turn on the 120 VAC Inverter Breaker
2. On the 120 VAC Load Center turn on the AC Main 30A breaker
3. On the 120VAC Load Center turn on the Outlets breaker
4. Open the desired 120 VAC GFI Outlet cover and plug in desired load

Using PEAK System to Provide 220VAC 1Ø Electricity

Locate the power control box. Following the sequence shown in the picture below, switch on and operate 220VAC single phase loads.



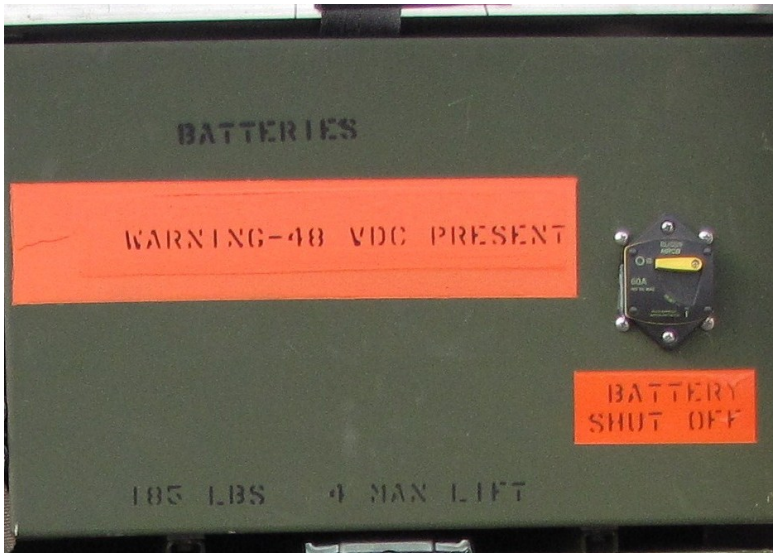
1 – Turn on the 220 VAC Inverter breaker
2 – On the 220 VAC Load Center turn on the AC Main breaker
3 – On the 220 VAC Load Center turn on the Single Phase Outlet breaker
4 – Open the 220VAC Outlet cover and plug in desired load. (matching male plug is included in accessories toolkit)

Charging Batteries with Solar

1. Set up solar array as described in *Setting Up Solar Array* section of the manual.

2. Electrically connect solar array to control box as described in *Setting Up Solar Array* section of the manual.

3. Turn on Main Disconnect switches on all three battery boxes as shown in the picture below. Turn on switch by rotating the yellow bar from a horizontal position to a vertical position.



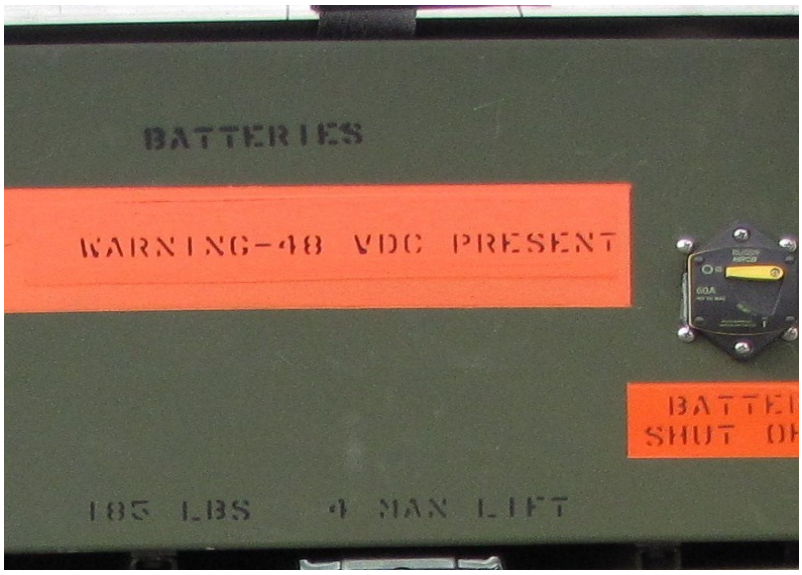
4. On the upper power control box, locate the Solar Charge Controller breaker and turn it on as shown in the picture below.

5. On the lower power control box, locate the MATE battery and charging monitor screen and verify that current is being produced by the solar panels and is charging the batteries. Press Status/ CC/Meter to get to the meter screen and then use the Down/Up buttons to scroll through the various display parameters. See picture below.

6. The system is now charging from the sun and will automatically keep the batteries charged to the appropriate levels through day and night cycles. No further operator input is necessary and solar charging will continue indefinitely whenever there is sunlight available. Battery voltage will be maintained between 42 and 53 VDC. Any battery voltage over 50 VDC represents a fully charged battery bank.

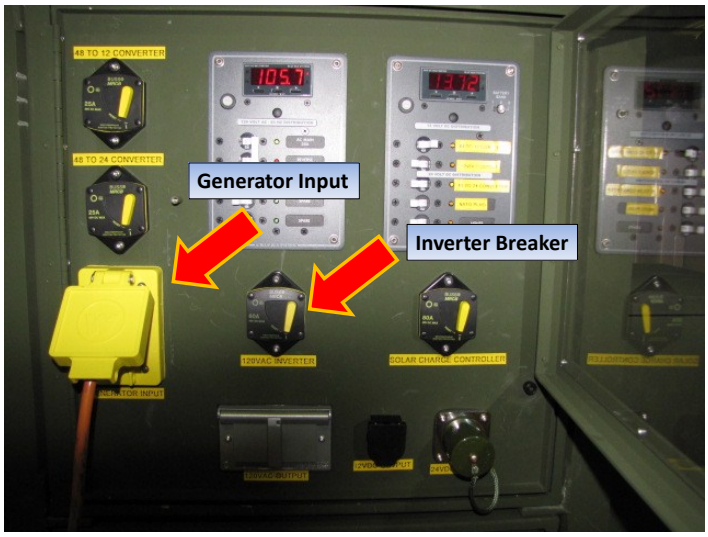
Charging Battery Banks Using the Generator

1. Turn on Main Disconnect switches on all three battery boxes as shown in the picture below. Turn on switch by rotating the yellow bar from a horizontal position to a vertical position.



2. On the upper power control box, locate the 120 V Inverter Breaker as shown in the picture below and turn it on. Start generator as described in the generator section of the manual. Plug the output power cord from the generator into the yellow Generator Input plug as shown in the picture below. The battery bank is now charging from the generator.

Batteries levels can be monitored using the MATE battery monitor as described in step 5 of the Charging From Solar section of the manual.



PEAK Main Site Battery Bank

The PEAK system utilizes a lithium ion battery bank with a capacity of 18 kWh operating at a buss voltage of 48 VDC. Under standard operation conditions the battery bank is controlled (connected to and disconnected from the PEAK power control boxes) by the 60A yellow handled breaker labeled Battery Shut Off on the front face of the battery boxes.

PEAK Battery Module Start and Shut-Down Instructions

Starting Module Bank

To start the PEAK battery module bank from a completely shut down state:

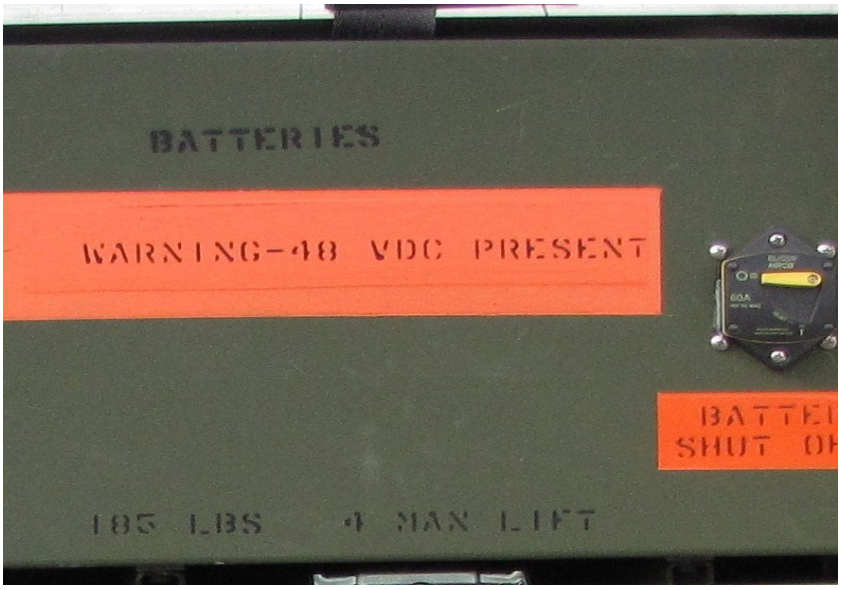
1. Turn on Battery Shut Off switches on all three battery boxes as shown in the picture below. Turn on switch by rotating the yellow bar from a horizontal position to a vertical position.

2. The battery banks are now be producing power.

Shutting Down a Module Bank

For **storage** or **transportation** it is recommended to completely shut down the PEAK battery modules. To turn off the PEAK batteries:

1. Turn off Battery Shut Off switches on all three battery boxes as shown in the picture below. Turn off switch by rotating the yellow bar from a vertical position to a horizontal position.



2. The batteries are now turned off and are prepared for storage or transport

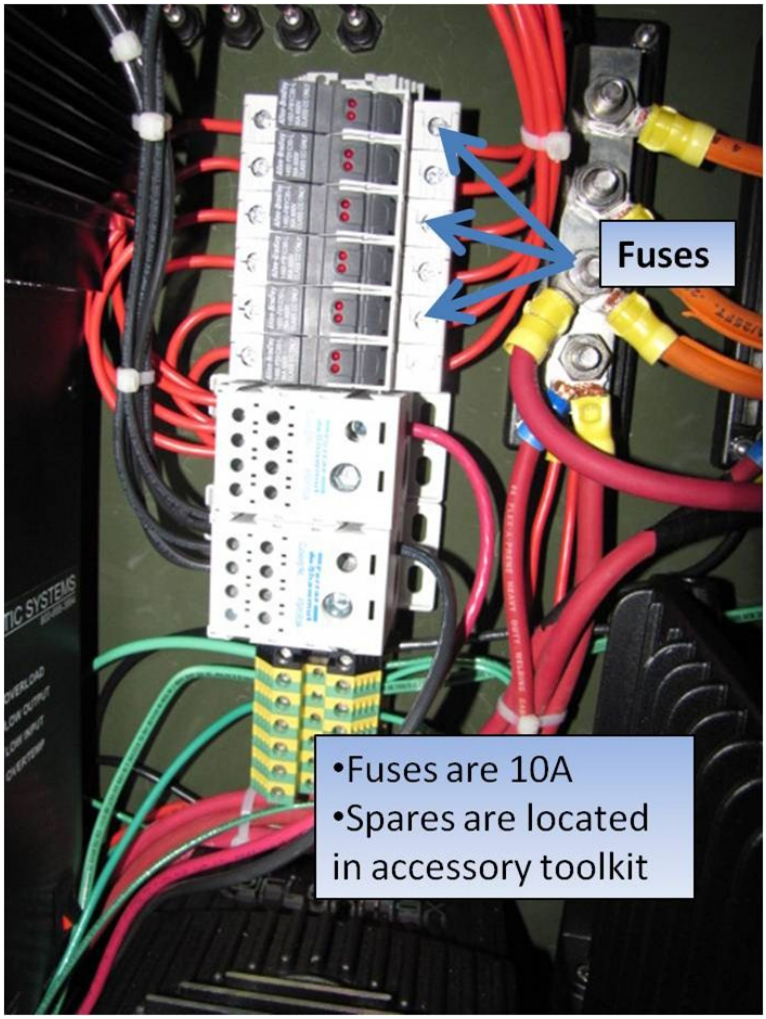
Solar Array Fuses

The solar array is protected from short circuits by a bank of six fuses located in the inside rear of the upper control box. Blown fuses are indicated by the red LED on top of the fuse block being illuminated.

The upper control box can be opened by unscrewing the thumbscrew latch and swinging the door open.

Under normal operating conditions these fuses will never blow. They are only likely to blow if there is transient voltage in the solar array to control box wire such as from a nearby lightning strike.

Fuses can be changed by pulling the dark grey door of the fuse holder open and removing blown fuse and inserting a new one. Fuse specifications are 10A and ample spares are included in the accessory toolkit. See picture below for fuse block location.



PEAK REMOTE SITE POWER

INFORMATON PROVIDED BY OASYS 3KW 12 V SYSTEM USER GUIDE (MAR 2012)

The remote communications site is a custom designed power supply provided by Braille Battery OASYS Energy. The remote site power configuration is weather resistant. The batteries are recharged using the main site solar array or the generator. Two remote site batteries are provided with the kit. The kit is fitted with three handles and wheels. The kit is labeled as a 3-person lift.

The specifications of the kit are:

Nominal Voltage	12.8V
Full Charge Range	13.2-13.6 V
Nominal Capacity	240 Ah, 3kWh
Operating Temperature	–20°C to +50°C (below 0C limited functionality)
Max Temperature	65C constant (75 C pulse temp)
Short Circuit Protection	Yes, System Off (Recovery – Switch On)
Dimensions H / W / D	31.30” x 20.40” x 15.50”
Weight	98 lbs (44.45 kg)
Estimated Usable Wattage	3000 wh (230+ AH, with 12+V average)
Maximum Watt Output	550 Watts
Low Voltage Protection	Undervoltage: 11.2-12.0V cut off
High Voltage Protection	Overvoltage: 15.0V

The Braille OASYS 3kWh Battery Module has one simple ON and OFF push button.

Prior to use, ensure battery is charged by viewing “percentage charged” on the battery monitor prior to powering ON battery. Battery can be charged at PEAK home site by plugging into any 110 VAC outlet.

POWER ON Battery:

1. Open battery case to remove power cable
2. Connect appropriate end to base station power outlet located on front
3. Connect opposite end to Braille OASYS 3kWh Battery
4. Depress push button for once until blue light ring illuminates around button showing power is flowing from battery

POWER OFF Battery:

1. Depress push button for several seconds until blue light ring is no longer lit
2. Disconnect power cable from base station and battery
3. Store cable inside battery box

Charging Battery Using AC Charger:

1. Connect supplied AC charging cord to the matching receptacle on the Braille OASYS 3kWh battery case. This cable is identified by the standard 120 VAC AC three prong plug on one end.
2. Plug the AC Battery Charger into an AC outlet.

NOTE: The battery charger will turn off automatically once the battery is fully charged

BATTERY OPERATION

The Braille Oasys 3kw is a very simple to operate device. With a single master power switch and a easy to navigate battery monitor, this allows for personnel to operate the system effectively, even without advanced training. The redundant design, on-board charging and integrated safety systems allow for portable energy storage in a wide variety of operational conditions.

POWERING SYSTEM ON / OFF

To Power the System between an “active-on” or “inactive-off” mode, depress the single circular power switch:

ON: Press Momentarily - Once ON the blue illuminated ring will be ON. If the blue ring is illuminated the master internal switch makes internal contact and will provide 12volt power supply to the output connector.

OFF: Press and hold for 3-4 seconds. If the blue ring is not illuminated the output connecter will not provide power.

SYSTEM CHARGING

Utilizing the onboard charger is activated by plugging the external input connector to 110/220 volt power AC power. The onboard charger will automatically switch for the input voltage and initiate charging if the battery voltage or capacity is below 95-98% state of charge. Once charging is initiated the charge current will continue until the battery reaches 98-100% state of charge or when the power supply cable is disconnected. The system will automatically connect and turn on during charging. If the system was off, after disconnecting charger, system will remain off.

SYSTEM STORAGE

Recommended Storage Voltage: >13.0 Volts @ 78F

is turned off. This will allow for a longer storage term and then the ability to have higher capacity when returned to service.

BATTERY GAUGE

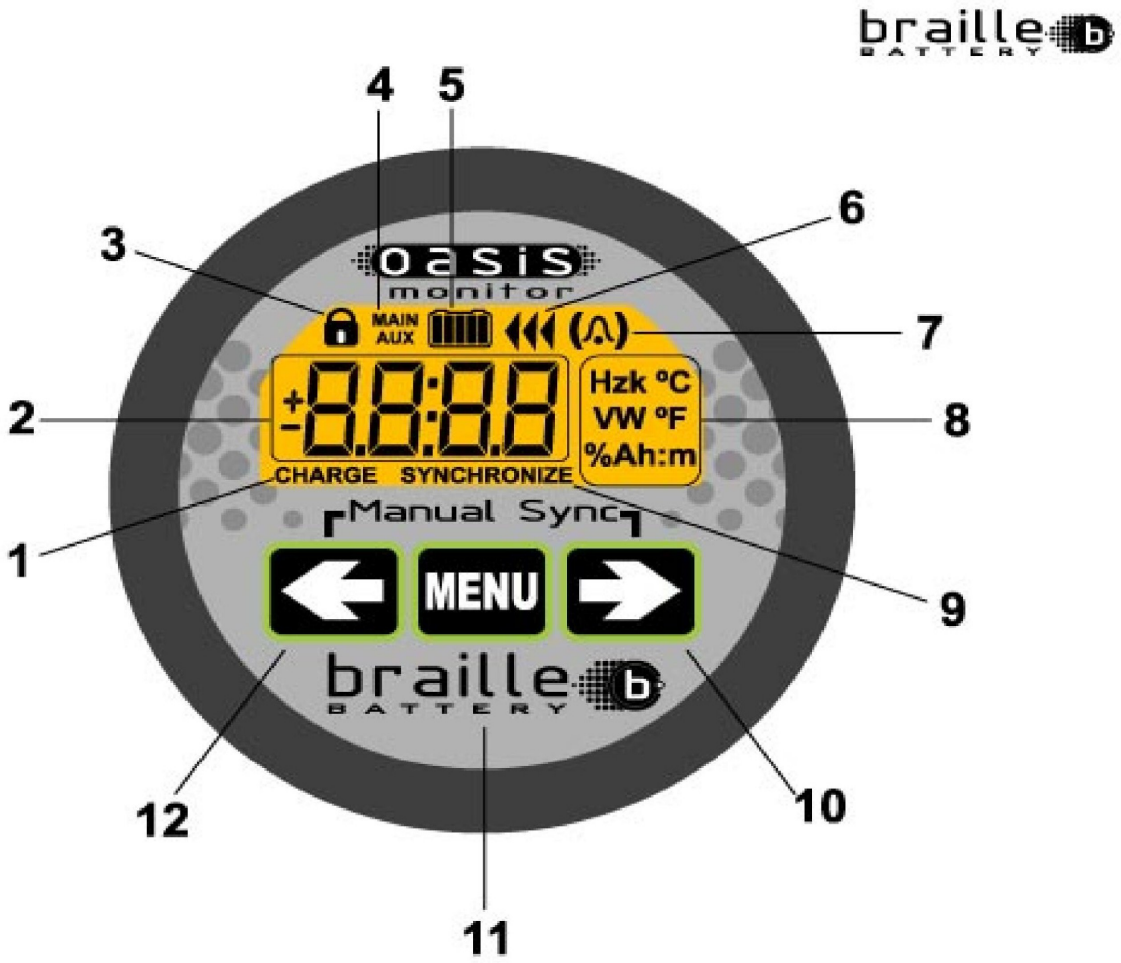
The Braille OASYS battery monitor allows for simple operation by toggling the left or right arrows to scroll through the following display modes:

- Battery Voltage
- Battery State of Charge
- Battery Current Draw
- Battery Total Amp Hours Consumed
- Battery Run Time Remaining
- Battery Temperature

NOTE: The OASYS Monitor has been designed to automotically reset (synchronize) after each full charge which occurs. This will reset the following items:

- Battery State of Charge
- Battery Total Amp Hours Consumed

In the event you wish to meter just the amperage consumed during a test or an event, you can synchronize the meter by depressing both buttons.



1. Charge battery indicator
2. Numeric value indicator field
3. Setup lock / Master lock indicator
4. Main battery or Auxiliary battery indicator
5. State-of-charge bar
6. Charging in progress indicator
7. Alarm activated indicator
8. Readout units
9. Synchronize indicator
10. Next value or Right key (>)
11. Menu key
12. Previous value or Left key (<)

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OASYS ENERGY

OASYS 3kWh Remote Site Battery Module

POINTS OF CONTACT

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